American Electro-platers' Society

(An Educational Society)

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MONTHLY REVIEW

SEPTEMBER, 1914

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I shall pass through this world but once. Any good thing, therefore, that I can do, or any kindness that I can show to any human being, let me do it now. Let me neither defer nor neglect it, for I shall not pass this way again.—*Amiel.*

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MONTHLY REVIEW

American Electro-platers' Society

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Vol. 1 SEPTEMBER, 1914 No. 4

Editorial

Standardizing Methods

The artistic temperament developed in the practical working plater is of value even if his job is of the commonest of commercial products, every art, every science has its fads and every fad has its followers; also every plater his idiosyncrasies, some are secretive, some follow a given routine and still others have no definite reason or even the knowledge why certain things are done a certain way, still another type is self satisfied, does his work well, just as his father and his grandfather did it before him. He is in the chrysalis state in his cocoon and as for progress,—just a dead one.

I make a plea for new work, research of the individual, imagination, anticipation and accuracy of statement of results whether good or bad, which will prove a blessing for all. This is the ideal of enlightened thinkers.

The last few years has wrought changes in many of the sciences, arts and industries that have been revolutionary, some have been accidental discoveries, others the result of long patient applied research. The X-ray and radium, the electrical furnace and the newer chemistry are factors to be dealt with that but thirty years ago were unknown. New, cheap and practical processes have been demonstrated, chemical, mechanical and electrical, for metalizing, preserving and coloring, until today one is seriously impressed by their broadened application; yet this field and this art have been handicapped by the wide variation of practice which has developed. Systematization, standardization and efficiency methods are the keynotes of our modern industries, a chromatic scale which leads, in many instances, to harmonious and practical results with a greater output per day per man, but which also, in many others, are theoretical and empirical, leaving the individual but the automatic plodder, may keep him alive, keep him moving, but mentally stagnant.

There are many problems for which as yet, no adequate solution is within our reach; yet, if we review what is being accomplished in daily practice in the various branches of electro-chemistry we cannot but be impressed with the wonderful progress that has been made, which should act as a stimulus to the individual for greater endeavor and boldness of action.

Hardly a month goes by but what some one of the technical magazines contain a new formula that asserts itself to common sense judgment, only to have this good impression entirely questioned by

the assertion, to be successful each plater must adapt it to his peculiar requirements. This is a fallacy, the deposition of metals, although an art, should be worked as an exact science, capable of being duplicated under similar conditions by any other man with an equal amount of brains. There is no good reason why anyone should have "peculiar requirements" if he is working standard formulae. Temperature, humidity, time, heat treatment, current consumed, composition of the base metal and the method of manufacture are all factors that enter into the nicety of the platers' finished product. Formulae and methods employed should be elaborated on technically, not only quantities given but hydrometer tests as well, for it is common knowledge that material from several sources vary greatly.

It is a fact that the so-called "critical" current density varies greatly with the size, shape and spacing of the electrodes and also with the size and shape of the tank so that the results and data obtained by one man usually cannot be duplicated by others without this detailed information.

In the meantime let us not belittle the facts but have all the information systematized, standardized and disseminated in a clear practical way for there is no more convincing testimony of the worth, soundness and practicability of any process than the independent duplication of the results from beginning to end.

Black Dips and Deposits

By L. H. O'Donnell, Newark Branch

For Yellow Brass

Dip 1 Water ..... 1 gal.
Potassium Persulphate ..... 1 oz.
Caustic Soda ..... 8 oz.

For Copper and Bronze

Water ..... 1 gal.
Caustic Soda ..... 4 oz.
Potassium Persulphate ..... 1 oz.

Above dips should be heated to as near boiling point as possible.

Dip 2 Water ..... 3 gal.
Carbonate of Soda ..... 1¾ lbs.
Carbonate of Ammonia ..... 2 lbs.
Acetate of Copper ..... 2 lbs.

Make a paste of the Acetate of Copper and dissolve in 1½ gals. water. Next dissolve Carbonate of Soda in ½ gal. water and add very slowly to Acetate of Copper solution. Next dissolve the 2 lbs. Carbonate of Ammonia in 1 gal. water and add the foregoing solution until it is clear. Use as hot as can be gotten in a hot water tank. Red brass will require a solution strong in ammonia. If brass works a greenish gray color and corrodes, solution contains too much ammonia, sal soda should then be added. If irredescence shows add more carbonate of ammonia.

For Brass

Dip 3 Carbonate of Copper ..... 8 oz.

Aqua Ammonia .....1 gal.
Carbonate of Soda.....8 oz.
Water .....2 qts.

Dip 4 Blue Black on Silver, Brass, etc.

Potassium Sulphuret .....4 oz.
Hyposulphite of Soda.....2 oz.
Double Nickel Salts.....4 oz.

Dip 5 Potassium Sulphuret, about half the size of a walnut

Chloride of Iron .....$\frac{1}{8}$ oz.
Water .....1 gal.

Gives a deeper and harder black than the ordinary sulphuret solution.

Solution 6

White Arsenic .....5 lbs.
Carbonate of Copper.....4 oz.
Potassium Cyanide .....$1\frac{3}{4}$ lbs.
Water .....5 gals.

Gives a nice black or steel gray. Use cast brass anodes and about 1 volt tension.

Solution 7 Gun Metal

Chloride of Bismuth.....1 oz.
Bichloride of Mercury.....2 oz.
Chloride of Copper.....1 oz.
Muriatic Acid .....6 oz.
Denatured Alcohol .....5 oz.
Water .....1 gal.

Use solution warm and allow plated articles to remain in boiling water for from five to ten minutes.

Solution 8 Black Nickel

Phosphate of Nickel.....$1\frac{1}{4}$ lbs.
Black Oxide of Manganese.....4 oz.
Phosphate of Soda.....$3\frac{1}{2}$ lbs.
Water .....8 gals.

Use 2 to 3 volts pressure.

Dip 9 Brown on Brass

Dissolve equal parts of Antimony Tersulphide and Arsenic Sulphite in Aqua Ammonia having a clear solution, use hot.

Solution 10 Black Nickel

Dissolve 4 oz. White Arsenic in 2 quarts of Ammonia by boiling. Make up 4 gals. double Sulphate of Nickel solution standing at 7 degrees Beaume, then add arsenic solution. Next make up single Sulphate of Nickel solution, $1\frac{1}{2}$ gals. 7 degrees Beaume, and in this dissolve 8 oz. Carbonate of Ammonia and add to first solution, clear with potassium cyanide. Use 1 or 2 volts, nickel anodes, and keep anodes clean. For a 2 gallon solution of the above use—

Double Nickel Salts.....12 oz.
Single Nickel Salts.....14 oz.
White Arsenic ..... $\frac{1}{2}$ oz.
Carbonate of Ammonia ..... 1 oz.

Potassium Cyanide, enough to clear solution.

Electro Plating from the Commercial Point of View

By Walter C. Gold, Philadelphia Branch

When the Editor invited me to write for this issue of the "Review" it occurred to me that it would be timely to say something along the line of electro plating considered commercially for, as a "supply man", I am deeply interested in the electro deposition of metals from several viewpoints, i. e., the artistic, the technical and the commercial, because I thoroughly concur with those who harbor the opinion that electro plating, or the electro-deposition of metals, is an *art* and, furthermore, that the business is still in its infancy and capable of great development.

I have frequently been asked by platers in the employ of manufacturing concerns whether I advise to go into business for themselves or to remain with their employers; and so I want to say a few words along this particular line.

Frankly speaking, the business of electro plating, especially the job end of it, is not in a satisfactory condition, when viewed from a commercial standpoint. From experience of a quarter century I am led to believe that most job platers make little more than a living, whereas the art should afford a good net profit to those so engaged. It takes years of experience and a knowledge of chemistry to enable one to be a good plater; and in view of the fact that electro plating is a specialty, the business certainty *should* result in more than a mere living.

The chief trouble in job plating seems to lie in the fact that there is no proper system in regard to the matter of costs. This can be readily proven by securing estimates from different shops. For instance, if a person had a thousand articles of a kind to polish and plate and he were to visit six shops, the difference in the prices quoted would probably be quite marked. I remember one man who made a tour of some plating shops with a certain article and the estimates varied as much as 100 per cent. He remarked, "Is there no bottom to this business of plating?" Hence it is to be assumed that costs are not accurately gauged; and in figuring costs, the overhead or fixed charges must be figured in addition to labor and material.

In the opinion of the writer there are a number of very essential points which a person must consider before embarking in the electro plating business: First is Experience. When I was at school I recollect that the visiting laymen who addressed us frequently used to lay much stress upon the value of *experience*. In those days, we did not understand that line of reasoning; but after we went into business life we soon realized the import of experience; and it does sometimes seem a great misfortune that a man's experience must necessarily go with him to the grave, and, also, that his successors must go through those same tribulations and trials before he learns the lessons of life! Several years experience then are necessary in the line. If a man thinks he can rush nowadays into the plating business and be successful, he is very much mistaken. Sometimes, men visit my office and tell me that they intend "to go into the

plating business" and ask for an estimate. If I judge from their conversation that they know little or nothing about the business, I ask them just what experience they have had; and if they answer that they have little or nothing, I unhesitatingly and frankly advise them not to make the venture; and most of them, after a thorough talk, have taken the free advice. On the other hand, some have gone in heedlessly and the results have invariably been the same—failure. I remember that about two years ago I was visited by three men from a town not far from Philadelphia. They said that they wanted to secure an estimate and upon questioning them I found they knew absolutely nothing about the business. One was a carpenter and he said not to include the Tanks, as "I can make them". Knowing the leakage troubles of platers, I told him that I felt sure that he could not make good Plating Tanks as it required experience to turn out Tanks that positively would not leak. I could tell the way he eyed me that my statement was not relished. However, I told them candidly that they had better not get into the line unless they intended to employ a good polisher and plater. The carpenter then remarked that it was evident that I was "trying to work some game on them". Upon insisting, I agreed to send them (and did forward) an itemized estimate, without the Tanks, covering the needs of a job plating establishment in nickel, brass, copper, silver and gold. I never heard anything further from them, but the town is still without a job shop! I consider it would be folly to start a plating establishment in that town as the prospects are too poor. They evidently took my advice and stayed out. A short time ago, an electrical supply man called and wanted an estimate on a plating outfit. In conversation he said that all he knew was what he had read in the plating books. Every plater knows that practical experience is needed, and so I advised him to continue with his job platers and not make the foolish venture. Months ago, a polisher came into the office for advice. He had a family and was getting a pretty fair salary, but he had the "bee" and, although I urged him not to go into business with a plater friend, he disregarded my views and they bought out a small plating plant far removed from the central business section. The result was a complete failure and he told me afterwards that he had lost hundreds of dollars in wages, besides his savings which went into the scheme. This man was a very good polisher, but he lacked capital, judgment and that second qualification—executive ability. This latter, of course, embraces the ability to properly run the business, i. e., to finance it, to handle one's employees successfully, to be able to properly figure costs, to properly judge who shall have credit and to know the proper prices to charge, etc. Years ago, I received a request for price on a plating outfit from a plater in a distant city. I took a train and met him at a hotel and thoroughly discussed the situation. He, too, had the "bee". I advised him to stay out of it, because he had a family and but a few hundred dollars saved up and without any business experience whatsoever. "But," he said, "there is Mr. So and So, look at the prices he is charging; he is making money!" True, Mr.

So and So was a successful plater because he had those qualifications before emphasized. Too many platers charge insufficiently for their work, consequently in due course they fail—the leak can't last forever! Those "overhead" or fixed charges must ever be borne in mind! But, alas, too many forget them in their desire to get business. It sometimes is amusing to come into contact with men who seem to think that plating is a simple, easy business. My readers will agree with me that it may look easy to the unsophisticated when he watches a plater at work, but it's a different proposition when one comes to run the plant.

Third: Capital. The electro plating business cannot be conducted on a "shoestring". It takes money to buy a good outfit and provide sufficient capital to conduct the business. I have seen good platers fail because they did not have sufficient capital. A man must have enough money to tide him over for at least a year—until he is established. A man with a family cannot afford to give up a good salaried position and embark on any venture without capital. The matter of capital then is of much importance. Every plater who considers going into business for himself must realize that his revenue stops when he gives up his position and that months must elapse (if he starts a new business) before money is received in quantities to place him in easy circumstances financially.

Fourth: The Prospects. If a plater intends to buy out an established business, such a move is entirely different from starting a new business, especially where one is unknown.

Fifth: A plater considering the matter of entering business for himself should be a good polisher for the primal reason that the quality of the plating depends very materially on the condition of the work when brought to the bath; furthermore, grinding and polishing being a greater cost than plating; cast iron being the most expensive of all the metals to prepare for the bath and the plater should be posted on these costs. Of course, if a plater intends to go into partnership with a good polisher, he is in better shape to succeed; and yet, considering the matter from an economical point of view, the plater really should be a good polisher; each partner should understand the work of the other in case of an emergency. Any one who is in business on his own account knows full well the uncertainties of one's plans, however carefully laid.

Now, what I have said is not intended to absolutely discourage any fellow-member of our Society from entering business on his own account. The object of this paper is to endeavor to point out the necessary qualifications in order to succeed. In all cases I would advise consulting with one or more business men whom one can trust for advice. As pointed out, mere capital will not insure success; on the other hand, neither will experience, even though it cover many years in any line of endeavor. My belief for a long time has been that there are already too many platers in the job line in the field, consequently prices are demoralized. It would be better if there were less platers and a higher class of work produced. It is an established fact in business that when a business, profession or

calling is overcrowded that prices are cut and the quality of the work is thereby lowered. In conversing with a successful plater recently he voiced the same ideas.

If what I have written will be of benefit to any member of the A. E. S. the effort will not have been in vain.

Concerning Pickling

By Joseph Walters

Supreme Officers A. E. S.

Gentlemen:

I regret that my wife's serious illness prevented me from attending the convention at Chicago. I should have liked very much to have had the pleasure of meeting you gentlemen personally. Permit me to congratulate you on your elevation to the highest offices in the gift of our membership. May good health and prosperity be yours during your terms of office and ever after. I am gratified indeed at our "new born babe,"—The Monthly Review, and, judging by its initial appearance, I am confident of its healthy growth and usefulness.

Permit me to call your attention to the paper read at the convention and published in the Review, entitled, "To pickle or not to pickle." I agree with the gentlemen that to pickle or not to pickle is not always the choice of the plater. In certain shops the castings are made so hard that pickling becomes a necessity, but some shops produce iron castings (for plating purposes) so soft that it does not require pickling to soften them. The gentleman concedes the fact that, "Many are opposed to pickling, and so is he," for he says, "I have seen castings that could be polished as economically without pickling." Thanks. If castings can be made soft (not requiring pickling) one time, why not all the time? He says that pickling is a necessary evil. Right here is where we cross swords. I do not concede it at all. Scientific management by the foundryman applied to this evil will prove it to be an unnecessary evil, for there is no such thing as a necessary evil in the social, moral, political or business methods of today that is necessary or desirable. The saloon, for instance, claimed by many a necessary evil, is not at all necessary to the sober man. Houses of prostitution, for thousands of years considered a necessary evil by many, but with the light of the Twentieth Century knowledge it is today declared by the best informed social economists that the clean, moral man does not need them. And so with pickling—if it is an evil, and the gentleman agrees with me that it is, for he calls it a "necessary evil." I say if it is an evil then it is unnecessary, because it can be remedied. Modern foundry practice has become one of the learned professions, as much so as Electroplating and Metallurgy, and the art of foundrying and cupola practice teaches that iron castings can be made to specifications—hard, medium or soft. If you remember, gentlemen, I said in my article to which the gentleman referred, "As a plater I refuse to correct the faults and incom-

petence of the foundry." It is not at all a subject for the plater, but for the foundry. I am not attacking this or that special plant, or men who are compelled to pickle, but the principle—the unnecessary evil of pickling.

We know that the world in its different phases of evolution passed through certain so-called ages—the Stone Age, The Iron Age and the Bronze Age. I think this day and time should be called the "Standard Age." Everything, or nearly so, is being standardized. We Americans have become educated to the "Standard Make" in everything. The clothes we wear, the food we eat, are assured to be of standard quality. Our coin, made by Uncle Sam, the most reliable and greatest money maker in the world, has for its motto, "In God we trust," a guarantee of standard quality. Why not have standard Iron castings for the electro plater? Instead of arguing, which at best is a road leading to nowhere, let the gentleman to whose article I refer and any other platers who likewise think that pickling is a necessary evil, join me in a communication to the National Foundry Association. Will the pickle platers kindly drop me a card in regard to this? I know from tests made not in one shop but in many, and you will all agree that castings can be made of a uniform softness, and if pickling is resorted to it is an added expense.

The facts in a nut-shell are these: Castings can be made soft enough, and milled clean enough not to necessitate pickling, and the time is not far distant—I can almost hear the bells tolling the death knell of pickling, and see the platers who were compelled to pickle marching with joyous hearts beside the funeral bier.

So much has been said concerning the standardizing of solutions, but as yet I have seen nothing offered to accomplish it. Let us make a beginning by starting with nickle. I suggest that a committee be appointed composed of nickle platers. Let them get together with the aid of one or more Electro-chemists, preferably ones that are connected with the supply houses, as they are more competent to aid the committee than Electro-chemists whose knowledge and experience at best is only laboratory experiments. Let the committee agree on a meeting place, which would serve the purpose better than by correspondence, and adopt a solution that will meet modern requirements—having a definite amount of metallic salts; at what voltage and amperage to use it, and a simple method of determining its contents at any time. To make possible such a committee, I suggest that an assessment be made on every branch to defray the expenses incidental to the committee. This committee would report to the Supreme Society and their findings be approved by them before its final adoption. When a nickle solution shall have been adopted, then take up silver, gold, etc.

The standarding of plating solutions is an assured fact and it is only a question of time. If we do not do it, other societies like the Electro-chemists will. But do not let other organizations do things that rightfully belong to us. When we shall have accomplished this most important necessity for the plating fraternity the

American Electroplaters' Society will be recognized and classed with other scientific organizations, and the plater will come into his own.

Efficiency

The hours I spend at work, dear heart,
Are as arithmetic to me;
I count my motions, every one apart—
Efficiency!

Each hour a task, task a test,
Until my heart with doubt is wrung;
I conservate my derndest, but at best
The boss is stung!

O theories that twist and turn!
O frantic gain—and laggard loss!
I'll standardize, and strive at last to learn
To please the boss,
By gum!
To please the boss.

By Corinne Rockwell Swain.

The Ionization Theory*

By Prof. David H. Childs

I want to take a moment at this time to say that I appreciate the honor you have conferred upon me by electing me an honorary member of this branch of the American Electroplaters Society. I am not a practical electroplater; I am a chemist; but I hope that will not prevent me from being of some service to you, and I shall be glad to be called on for any information that I can give you. And if at any time the chemist seems to put some things up to you in a way that makes them a little out of your reach, because of his peculiar ways of saying things I hope you will feel free to call upon me to bridge the gap and state them in terms that are yours by reason of long use. And sometimes you may want a chance to point out to the chemist that he is at fault; if so, come ahead and fire it at me as a representative of that fraternity I can assure you that I am accustomed to that sort of treatment.

In looking over some of your papers I see some things written in the chemist's language. I want to take a little time tonight to go over those terms and see that we all know what they mean. I know what it is to try to read an article full of terms that are unknown, and how soon we feel that the writer does not have us in mind when he writes. Let us clear away all those difficulties, so that we can use the good things that are handed us, and while I do not suppose that any one here is ignorant of all the things that I shall talk about it will clear the ground for some other things that I hope to talk about in later meetings.

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*Read before Buffalo Branch Sept. 5th, 1914.

I see that the Ionic Theory, called also the Ionization Theory, and the Theory of Electrolitic Dissociation, is creeping into your work. To get to a discussion of this let me first go over a little chemistry. If we take a little salt and grind it as fine as we can, we finally get a particle so fine that we cannot grind it more without breaking up the salt. This particle we call the molecule. It cannot be broken up by any process except a chemical one. It will not be salt if divided more. We write it out in the chemical terms, Sodium Chloride. In the shorthand of the chemist it is NaCl. That is the form used to save time in writing, and for another reason as we will see later. Now if we go to some chemical means we will break it up into two other things, sodium and chlorine, the first a white metal, the other a gas. Neither is salt. It was salt as long as we used only physical means as the grinding, but it is no longer salt when chemical means have broken it up. The small particle of salt is a molecule of that substance, the small bit of sodium obtained is an atom. This atom cannot exist alone, the molecule can. That is where we draw the line.

If we dissolve the salt in water, we get at once a breaking up into something different. The Na goes off by itself with a charge of electricity upon it, and is then called an ion. The Cl also has a charge on it and is likewise an ion. That is what happens when we dissolve a salt in water according to the Ionic Theory. You know a theory is simply an attempt to explain some facts that we have seen. It is good as long as it will explain all the things we see, and when it does not, it falls down. This theory does explain our facts, and the more facts we know, the better it works.

Now you may want to ask me, How do you know that all this occurs? Or you may be asking under your breath, Even if it does explain the facts, "What's the use of it all anyway?" I'll answer the first now, and take the other in its turn.

Suppose we take two glasses and in one put some water, pure water, and in the other pure alcohol. Now let us try to send an electric current through each. Neither conducts the current. Let us add some salt to each and try the current again. The salt dissolves in both, but the water and salt carries the current, while the other does not. The reason as pointed out by this theory is as follows: In the water the salt breaks up into two particles, called ions, each charged with electricity, while in the alcohol it does not break up. There are several other good reasons why we think it breaks up, but the one will do for this time. The others only tend to make us believe more fully that we are on the right track. They have to do with the raising of the boiling point of these solutions and the lowering of the freezing point. Our theory now says that certain dissolved substances in a proper solvent break up into ions, charged with electricity; some of these being positively charged and some negatively; and that these ions carry the electricity through the solutions. That is a statement of the theory.

Some things like sugar will not break up. Things that will do so, like salt, are called electrolytes, those that do not break up are

called non-electrolytes. The water or alcohol is called the solvent, the dissolved substance is called the solute. The positively charged ions are called the cathions, because they go to the cathode, the negatively charged ones are called anions because they go to the anode.

Now I do not have to tell you that you do not increase the conductivity of your baths by adding glue, molasses, or such things to them; and you know you do increase it by adding acid and such things as salts. This theory points out to you why these things are so. The glue and such things are non-electrolytes, while the acids and salts are electrolytes, so are the alkalies.

I have in my library some things that may interest you. Here is the latest number of the Transactions of the Am. Electrochemical Soc. In it I find a rapid method for the determination of free cyanide in the plating bath. With it any one of you can tell in five minutes time just how much free cyanide you have, that is, cyanide present as KCN or NaCN. Some night I would be glad to bring up here the solutions and show you just how it is done, and at that time I would like to have you bring here a small bottle of the bath you are using, and let us see how much or how little they differ. We will take the bath used daily as a standard, and see what differences we can find. Or if you will save a sample each week until we do that we will find how much each bath varies when there is no chemical control, and perhaps show that the services of a chemist are not needed in our plant.

The apparatus would cost in the neighborhood of $5.25, as some of the solutions have to be accurately weighed and a good balance is probably too expensive at present. Each analysis can be made at an average cost of above five cents. One solution is sufficient for 20 determinations, the other will last about two years, averaging one test a day. I will give a practical demonstration at a later meeting.

The following are some notes I have made which I thought might interest some of you, and will be glad to give further details on request.

Papers on Electroplating found in the Trans. Am. Electrochem. Soc.

Electrolytic Corrosion of Electroplates Articles, 1911, 59.

Chemistry of Electroplating, Bancroft, 1904, 27.

Notes on the Composition of Electroplating Solutions, 1903, 227.

Some unsolved Problems in Electroplating, Hogaboom, 1911, 53.

Electrical Conductance of Conc. Aq. Solutions, Washburn, 1912, 125.

Smee's Theory of Electrolytic Deposits, Bancroft, 1912, 239.

Effect of Addition Substances on Lead Plating Baths, Mathers and Overmen, 1912, 313.

Electrodeposition of Metals, W. L. Miller, 1913, 17.

Electrodeposition of Gold and Silver, F. C. Frary, 25.

Electrodeposition of Cobalt and Nickle, O. P. Watts, 99.

Electrodeposition of Lead, F. C. Mathers, 153.

Electrodeposition of Tin, E. F. Kern, 193.

Electrodeposition of Copper, C. W. Bennett, 233.

Discussion, 261—299. (Am. Electroplaters Soc.)

Solid, Thick Deposits of Lead from Acetate Solutions, Mathers, 1913, 2, 315.

I have also the monthly publication, Metallurgical & Chemical Engineering, the three publications of the American Chemical Society and the occasional papers from the Faraday Society. In so far as articles in these may be of interest to the society, I shall be glad to review them at these meetings. Chemical Abstracts, by the American Chemical Society, contains notices of practically all the scientific publications.

Do not misunderstand me. I do not know it all. I shall, however, be glad to keep this work in mind when reading these papers, and will be glad to have you refer to me any question along the unpractical lines which I will endeavor to answer then or after looking up. I will not promise to answer all questions offhand.

WHAT THE BRANCHES ARE DOING

NOTE TO THE SECRETARIES—All correspondence for this department must be in the hands of the editor by the 15th of each month.

SUPREME SOCIETY

Meets first week in June, 1915, at Dayton, Ohio. Secretary, Walter Fraine, 507 Grand Avenue, Dayton, Ohio.

NEW YORK

Meets fourth Friday of each month at Broadway Central Hotel, New York City, 8 P. M. Secretary, Joseph Minges, 148 Schenck Avenue, Brooklyn, N. Y.

The regular monthly meeting was held Friday, Aug. 28th, with a fair attendance. A discussion on plating dynamos was indulged in and opinions expressed as to the cause of sparking and the prevention thereof.

The relative value of potassium cyanide and sodium cyanide was thrashed out with the result that potassium cyanide came out in the lead.

On Sunday, August 16th, the first annual outing of the Newark-New York Branches took place at Glenwood, L. I. About twenty-three members and their wives took advantage of the good weather and a splendid time was enjoyed by all. The crowd met during the early part of the forenoon and at two o'clock the shore dinner was served. Immediately after the dinner the big event of the day took place. This was a ball game between the rival branches which Newark Branch won by the score of 9 to 4. The chief star of the affair was Bill Schneider, who cleverly coached the Newark boys while they were on the bases. His profound and noisy rooting so unnerved Twirler Flanagan of the Giants, that Newark walloped in 6 runs in the fifth inning and sewed up the game. Mr. Charles Proctor essayed to umpire the game and he filled his post so nobly that his resignation as arbiter was unanimously requested after he had occupied his position for one inning. He declared his neutrality and disappeared on the horizon. Supreme Treasurer Sterling played second base for his branch and covered himself with glory. President Haddow of New York played at third base and filled his position well. He also got a three base hit which took one of the boards out of the left field fence. (This report was censored by Samuel R. Taylor of the Newark Branch.)

CINCINNATI

Meets once each month at Dennison Hotel, Cincinnati, Ohio. Secretary, F. H. Nordman, 720 Froom Ave., Cincinnati, Ohio.

At our last meeting quite a discussion took place regarding "Acid Dips." The remarks were confined mainly to the keeping up of a bright acid dip composed of 2 parts sulphuric acid of 66 deg. Beaume, and 1 part nitric acid of 40 deg. with a small addition of either common salt or hydrochloric acid. As usual there was more

than one view taken of the matter. Some contending, from long experience in acid dipping that, to obtain the best results, especially in bright dipping metal thoroughly cut down, in which the object is to retain the greatest lustre and etch it the least, that the acid dip should be fed from a stock solution or mixture of acids, believing, that in feeding from a stock solution (after cooling) that the heat generated in mixing the two acids has driven off an element detrimental to the best results in bright dipping. Some of the members were equally firm in their belief that the same results could be obtained by feeding the acid dip direct from the carboys.

Cincinnati Branch invites the expression of the membership in general on this subject, and especially would we welcome a clear explanation of the chemical action which takes place when mixing 2 parts sulphuric acid and 1 part nitric acid. We invite all to give their opinion on same.

CHICAGO

Meets fourth Saturday of each month, 8 P. M., Western Building, Randolph Street and Michigan Avenue. Secretary, H. E. Willmore, 5911 South Boulevard, Chicago, Ill.

The regular monthly meeting was held Saturday, August 22nd, with President O. E. Servis in the chair. After the routine business of the evening was disposed of a lengthy discussion took place regarding the deposition of gold on a zinc-aluminum alloy. It was decided that to insure the best results the metal should first be "struck" in a cyanide copper or nickel solution.

Owing to the extreme heat of the evening the meeting adjourned at an early hour.

NEWARK

Meets first and third Friday of each month, 8 P. M., 47 Bank Street, Newark, N. J. Secretary, Chas. A. Stiehle, 46 West Madison Avenue, Irvington, N. J.

The regular meeting was held Sept. 4th. Twenty-two members being present and two members from New York Branch.

A committee was appointed, with power to engage a room suitable for use as a laboratory and meeting place. Therefore, the place of meeting hereafter will be at 47 Bank street, Newark, N. J.

The question was asked by one of the members present, What causes pitted deposits in nickel? Samples of the pitted work were exhibited. It was decided the chief cause was lack of nickel content of bath. Remedy: Add nickel sulphate and ammonium chloride. As a positive prevention of the trouble the member was advised to agitate his solution, either by moving the cathode rods or by passing a current of air through the solution.

At a meeting to be held September 18th, Mr. Walter Barry will begin a series of lectures on the use of the chemical balance and also give practical demonstration.

Mr. T. B. Haddow, president of New York Branch, will give a practical demonstration of a method for testing plating solutions for free cyanide.

DETROIT

Meets first Friday of each month at Prismatic Hall, 140 1st St. Secretary, George J. Kutzen, 518 Alfred St., Detroit, Mich.

At the regular meeting of Detroit Branch held September 4th, Librarian Shepherd acted as chairman in the absence of President Schultz.

It was decided that all applicants, when notified of their election and do not remit their dues within a reasonable length of time, will be dropped.

All members present were called upon to state their methods of cleaning and what preparations were used. After the smoke of battle was cleared away a vote was taken on the subject; 90 per cent. of the members were in favor of "Ele-Kem," 5 per cent. various other preparations and 5 per cent. caustic soda and potash.

TORONTO

Meets fourth Thursday of each month at Occidental Hall, Bathurst and Queen Streets. Secretary, Ernest Coles, P. O. Box 5, Coleman, Ont.

The regular meeting was held Thursday, August 27th, with President Magill in the chair and a good attendance. A splendid meeting from every point of view, discussions were good and varied and the members left anxiously waiting for the next meeting, at which we are to have a talk on the three wire system from a practical viewpoint by Sup. First Vice-Pres. W. S. Barrows and Mr. W. W. Wells, Jr.

The following paper was presented, via the question box, at the meeting: What are objections to the use of the sodas in the cyanide copper solution? Is potassium carbonate to be preferred? If so, why?

This paper provided quite an interesting subject, objections being general. One member stated that his objections were that soda caused "spotting out" and quoted a case of how a plater on taking a new position was confronted with that trouble and was told by the firm's chemist that it could not be eliminated. Tests proved that the solution contained a large quantity of soda. A new solution was made without the use of soda in any form and the "spotting out" was eliminated. Another member, a man of undisputed ability with cyanide copper solutions, prefaced his objections by asking, of what use is soda in the solution? and stated that he had never been able to prove to his personal satisfaction that it was of any use, but had on the contrary found it to be a positive detriment to a good deposit. He too quoted instances of where the elimination of soda eliminated trouble.

In regard to the use of hyposulphite of soda, the summary of opinion was that experience had shown that, except for its use in minute quantities in the case of bright copper plating its effect was even worse than that of the others.

On Saturday, August 22nd, a party of the members paid a visit to Hamilton, Ont., and an enjoyable day's outing was spent.

We were met at the station by a party of the platers of that city and after a sightseeing trip around the town journeyed out to Burlington Beach. A hearty supper was served at the Lakeside Hotel, to which all did ample justice. The A. E. S. never had such a boosting as it received that day and the other fellows were just as keen to hear about it. A number of application blanks were asked for and after the handshakes and the promise of a return visit we started for home feeling well pleased with the prospects of a charter being needed in the near future for Hamilton, Ontario.

A member of this branch writes to ask if any of his fellow members know of a method for removing the tarnish or oxide formed on nickel due to intense heat. He says, "our oven doors are malleable iron, they fit tight to a malleable oven frame which keeps the door in contact with the intense heat which causes them to tarnish on corner next to fire box." He would like to know if this tarnish can be prevented and asks that replies be sent to the secretary of Toronto branch.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Penna., 34th and Spruce Streets, Philadelphia, Pa. Secretary, Philip Uhl, 2432 North Twenty-ninth Street, Philadelphia, Pa.

The regular monthly meeting was held September 4th with President Joseph L. Dinan in the chair and a fair attendance.

The resignation of F. C. Clement was accepted.

Mr. A. Hicks exhibited samples of barrel plating of lock parts in brass, bronze, nickel, black nickel and zinc which were greatly admired by the members. Mr. Hicks has promised to present a paper on "Duplex Copper" at the October meeting. Brass solutions and questions in the Review will also be discussed at that meeting.

BUFFALO

Meets first Saturday of each month at the University of Buffalo, 8 P. M. Secretary, John G. Murphy, 71 Dingens Street, Buffalo, N. Y.

At the regular meeting held September 5th only nine members were present, the president and treasurer being absent. After the routine business of the meeting was concluded Prof. David H. Childs of the University of Buffalo, read a paper on the Ionization Theory, which was well delivered and easily understood. He was given a vote of thanks for his efforts in our behalf. Prof. Childs is an honorary member of this branch.

After a discussion relative to the chemist and plater, it was decided that the members of this branch should attend the laboratory of Tech. High School as a class, taking up the fundamental principals of chemistry two nights, and one night work out experiments designed to afford methods of analysis of plating solutions.

At a special meeting held September 12th it was resolved that only those present and those absent who had paid their dues would

be recognized as members and the per capita tax be paid accordingly.

Second: No more notifications of regular meetings be sent out as members know when and where meetings are held.

Third: Reviews shall be issued only to members in good standing and only at meetings. Those unable to attend, desiring copies, must notify the secretary and forward the necessary amount for postage.

Fourth: Commencing with the November meeting, the application fee be raised to two dollars and probably later to five dollars. The money to be used for branch equipment. One more effort will be made to get delinquent members to pay their dues.

Librarian F. A. Shepherd addressed the members as follows:

Some of you will no doubt recall my asking Prof. Childs a question concerning the relation of the and—signs according to Faraday's law. This is what was meant: In an aquaous solution of sodium chloride, for example, it is assumed that sodium and chlorine are present as ions.

Librarian F. A. Shepherd addressed the members as follows:

GENTLEMEN:—The subject I am giving you tonight for consideration is founded on the second fundamental law of Michael Faraday which states that, "The amount of metal deposited on the electrode from salts of the different metals, by the same amount of current, are proportional to the atomic weights of the metal in question divided by their valences." Thus, the same amount of current that would deposit a given atomic weight of silver (107.93 gms.) would deposit a half gram atomic weight of zinc ($\frac{65.4}{2}$=32.7 gms.) or cadmium $\frac{112.4}{2}$ = 56.2 gms.) or any bi-valent element; and a third gram atomic weight of any tri-valent element and so on. His first law was, "The amount of any given metal deposited in electrolysis was proportional to the amount of the current passed."

Some of you no doubt will recall my asking Prof. Childs a question concerning the relation of the + and — signs according to Faraday's law. This is what was meant. In an aquaous solution of sodium chloride, for example, it is assumed that sodium and chlorine are present as ions. To bring this hypothesis into harmony with the well known fact, that free sodium cannot exist in contact with water, and furthermore, to explain the fact, that the ions are attracted by the electrically charged electrodes, it is necessary to ascribe or give properties to the ions which are not attributed or given to elementary chemistry.

BRIDGEPORT

Meets third Friday of each month at the office of the Brass World, 260 John Street, Bridgeport, Conn. Secretary, Nelson Barnard, 858 Howard Ave., Bridgeport, Conn.

The regular meeting of this branch was held Friday, August

21st. After the regular business the meeting was open to a talk on the ways and means of getting the best results out of each meeting. It was decided to form a program committee to arrange a subject for each meeting. The same being voted on, Messrs. W. C. Stratton, William Thompson and H. de Joannis were elected to serve on this committee.

ST. LOUIS

Meets fourth Saturday of each month at Public Library Assembly Rooms. Secretary, H. H. Williams, 2134 Nebraska Avenue, St. Louis, Mo.

The August meeting of this branch was in the form of an outing as well as a business and educational gathering. Mr. E. J. Musick, our president, invited us to his home in University City and not only arranged a series of outdoor games, but also served an elegant and bountiful lunch, which was evidently of much satisfaction to all. Mr. Musick announced arrangements had been made for a theater party, this was voted down, as our friend, Mr. F. J. Liscomb, who was present and we know is used to good things, said, "All this is too good to leave," so after being entertained by Messrs. H. G. Nestman and H. H. Williams with piano selections a hearty vote of thanks was given our host and hostess. Mr. H. J. Richards carried off all honors at quoits and tennis. Mr. P. Tressider exhibited samples of ivory finish and explained the method. Members from Bellville and New Athens, Ill., were present.

MILWAUKEE

Meets first Friday of each month at Eagles Hall, 137 Second St., Secretary, E. C. Yaeger, 962 Ninth St., Milwaukee, Wis.

The regular meeting was held Friday, September 4th. Nickel Solutions was the subject for the evening's discussion. Questions asked at previous meeting were discussed and the following conclusions arrived at:

What is the best way to make a nickel solution? Answer. Boil water first, then add nickel salts until hydrometer test shows 6½ or 7 degrees.

Does the use of single salts result in a hard deposit? Ans. No.

What can be added to a nickel solution to increase its conductivity? Ans. Sal Ammoniac, common salt, magnesium sulphate, ammonium sulphate. The first two are unfavorable for iron and steel, and it is considered advisable to keep chlorides out of solutions used for plating these metals as their use caused them to rust much quicker.

How can we tell when a nickel solution is low in metal? Ans. By the following method of analysis:

Take 1 oz. of Nickel Salt, dissolve this in 1 pint of water, this equals a solution of 8 oz. of Nickel Salt per gallon.

This you call your Standard Solution.

Take 1 oz. of Cyanide, and dissolve this in 1 pint of water.

If you use double Nickel Salt, which is 15 per cent. Nickel, the solution will contain 1.2 oz. of Nickel per gallon.

Fill a 50 c.c. Burette with cyanide solution.

Take 10 c.c. of the Nickel Solution in a glass, to this add ammonia very slowly until your solution is a blue color, now run the cyanide solution from the burette into your blue solution (very slowly) until you get a clear wine color. You now read the burette to see how much cyanide you used which will say 10 c.c. You now multiply this by a number that will give you an answer of 1.2, which is the amount of Nickel in your Standard Solution.

Example: 10 c.c. of Cyanide × .12—1.2, therefore .12 is the number we want.

Now take 10 c.c. of Nickel Solution from your tank.

Fill your Burette of Cyanide from the pint solution you made and proceed as above. We will say that it took .12 c.c. of Cyanide to give us the clear wine color, the amount of Nickel per gallon would be 12 c.c. of cyanide × .12; which is the factor found—1.44 oz. of Nickel per gallon.

How can a nickel solution be made to plate bright? Ans. By the addition of gum arabic or transparent glue. We would like to hear from some of the other branches regarding this question.

How can a nickel solution be made to plate faster? Ans. First ascertain if solution has a sufficient metal content, then add a conducting salt.

How can we tell when a nickel solution is low in conduction salts? Ans. By the ammeter.

What makes a nickel solution plate black? Ans. Solution contains copper.

How can we tell when solution contains copper? Ans. By passing hydrogen sulphide gas through solution a dark brown deposit will result.

What causes a nickel solution to plate rough at the bottom of the work? Ans. Cloudy solution, too alkaline or too much current. Filter solution.

What causes foaming of a nickel solution? Ans. Too much free acid. Neutralize with nickel carbonate. Another reason, insufficient anode surface.

What makes a nickel solution cloudy after being worked hard all day? Ans. Constant agitation by putting in and taking out work.

If a nickel solution plates a hard metal how can it be changed so that it will give a soft deposit that will stand bending? Ans. By bringing solution to the neutral point and maintaining it in that condition.

Is it well to insulate lead pipe in a nickel solution and why? Ans. We advise insulating to prevent short circuiting by work dropping on pipe.

For our next meeting we will have as a subject, How to make a Cyanide Copper Solution, and discuss all its ailments.

DAYTON

Meets first and third Wednesday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Alphonz Lamoureux, 500 East First Street, Dayton, Ohio.

ROCHESTER

Meets second Friday of each month at Hotel Rochester. Secretary, C. V. Haring, 306 Dewey Avenue, Rochester, N. Y.

INDIANAPOLIS

Secretary, pro tem, J. C. Davenport, 349 Massachusetts Avenue, Indianapolis, Ind.

APPLICATIONS FOR MEMBERSHIP

NEW YORK—
George H. Gehling.....20 Augusta St., Irvington, N. J.
Thos. Brown.....28 Cornelia St., Brooklyn, N. Y.
Joseph Reuter.....251 Scholes St., Brooklyn, N. Y.

CHICAGO—
Jos. A. Seiler.....4334 N. Hamlin Ave., Chicago, Ill.

MILWAUKEE—
John Andresky.....925 25th Ave., Milwaukee, Wis.

ELECTED TO MEMBERSHIP

TORONTO—
Thos. C. Orr.....250 Dundas St., Toronto, Ont.

NEWARK—
William Taylor.....Newark, N. J.

CHICAGO—
M. E. Wainwright.....Coleman Hardware Co., Morris, Ill.
Jacob Hay .....2034 Bissell St., Chicago, Ill.

BRIDGEPORT—
Chas. H. Poland.....546 Sea View Ave., Bridgeport, Conn.

CHANGE OF ADDRESS

A. A. Nelson.....1502 W. Beardsley Ave., Champaign, Ill.
Frank J. Hanlon.....1400 Harvey St., Beloit, Wis.